

REMARKS

Claims 1-7 are pending in the application. Claims 1-7 have been amended and claims 8-10 have been added, leaving claims 1-10 for consideration upon entry of the present amendment. Applicant requests reconsideration in view of the amendment and remarks submitted herewith.

Claims 1-7 stand rejected under 35 U.S.C. § 103(a) as being anticipated by Ohtani et al. (US 5,605,846) ("Ohtani") in view of Williams et al. (US 6,238,582) ("Williams"). For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; and that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

Claim 1 includes the following element: "applying ion beam irradiation to a surface of a recrystallized semiconductor film obtained through the heating step at an angle of incidence of greater than 0° with respect to a direction of normal of the surface of said recrystallized semiconductor film, wherein projections generated on the surface of said recrystallized semiconductor film is eliminated by said application of ion beam irradiation." Claim 7 includes the following element: "wherein said recrystallized semiconductor film has a planar surface formed by eliminating, using ion beam irradiation with a tilted angle of incidence from a direction of normal of a surface of said recrystallized semiconductor film, projections generated on said recrystallized semiconductor film obtained through heating of a non-crystal semiconductor film formed on said substrate." Those elements require that the projections formed on a recrystallized semiconductor film can be selectively removed simply by directly applying ion beam irradiation with an angle of greater than 0° to a surface of the recrystallized semiconductor film. Ohtani and Williams do not teach or suggest those elements.

Ohtani fails to disclose generation of projections due to a heating process of a non-crystal semiconductor film. The Examiner asserts that the formation of non-uniform region

or non-uniform layers on the substrate, which are simply projections or surface defects, is inherent. Applicant respectfully traverses.

In order to support an anticipation rejection based on inherency, an Examiner must provide factual and technical grounds establishing that the inherent feature necessarily flows from the teachings of the prior art. *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1464 (Bd. Pat. App. & Int. 1990); *In re Oelrich*, 666 F.2d 578, 581, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981) (holding that inherency must flow as a necessary conclusion from the prior art, not simply a possible one). In this case, while it may be possible that surface defects may form as projections, it is not a necessary conclusion that projections will actually occur. Thus, Ohtani fails to disclose the formation of projections and as a result, also fails to recognize the necessity for eliminating any projections.

Williams discloses application of ion milling to a target layer and that there are a low angle and a high angle as the angle of incidence of beam with respect to a plane of a substrate. However, Williams uses an etching mask and selectively removes a region not covered by the mask. More specifically, an upper pole layer 52, which is formed in a predetermined pattern, is formed above a permalloy seed layer 54 and a gap layer 56, which are the target of etching. See Figure 2A. When an ion beam is irradiated at a low angle of incidence (with respect to a normal of plane of substrate) to a plane of substrate, the upper pole layer 52 (or a photoresist layer formed on the upper pole layer 52) is used as the etching mask, to etch and remove the seed layer 54 and the gap layer 56 in a pattern corresponding to the pattern of the upper pole layer 52. In regions in which the upper pole layer 52 does not exist, the seed layer 54 and the gap layer 56 are removed. Thus, if the upper pole layer 52 does not function as a mask, an object of Williams to obtain a column-shaped layered structure in a pattern by selectively removing the seed layer 54 and the gap layer cannot be achieved. Williams discloses, for example, in Figures 2D and 2F and specification, col. 8, lines 45-50 that the substrate is exposed to the ion beam at a high angle of incidence to remove any "etching debris" redeposited onto sidewall structures during the precedent low angle etching step. This process, however, is clearly directed to removing the "etching debris," and it is clear that there is no intent to remove the column structure itself. In

addition, another object of Williams is formation of a precise pattern "corresponding to a mask pattern."

Thus, Williams, which employs the ion milling method, does not consider selective etching of a target to be removed by direction application of ion beam irradiation to the entire surface including the target without using a mask. As such, there is nothing in Ohtani and Williams that teaches or suggests that the projections formed on a recrystallized semiconductor film can be selectively removed simply by directly applying ion beam irradiation with an angle of greater than 0° to a surface of the recrystallized semiconductor film. Accordingly, Ohtani and Williams do not teach or suggest all of the claimed limitations.

Moreover, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); MPEP § 2143.01. Thus, because Ohtani does not disclose the formation of the projections, there is absolutely no discussion about eliminating any such projections. As such, there is no motivation to combine Ohtani with Williams as asserted by the Examiner.

Accordingly, for at least the reasons set forth above, Applicant respectfully requests that the rejection be withdrawn.

In addition, claims 8-10 have been added. Claims 8 and 9 include all of the elements of claim 7 and claim 10 includes all of the elements of claim 1. Thus, for the reasons discussed above, claims 8-10 are allowable claims.

In view of the foregoing, it is respectfully submitted that the instant application is in condition for allowance. Accordingly, it is respectfully requested that this application be allowed and a Notice of Allowance issued. If the Examiner believes that a telephone conference with Applicant's attorneys would be advantageous to the disposition of this case, the Examiner is cordially requested to telephone the undersigned.

In the event the Commissioner of Patents and Trademarks deems additional fees to be due in connection with this application, Applicant's attorney hereby authorizes that such fee be charged to Deposit Account No. 06-1130.

Respectfully submitted,

CANTOR COLBURN LLP

By: 

Lisa A. Bongiovi

Registration No. 48,933

CANTOR COLBURN LLP

55 Griffin Road South

Bloomfield, CT 06002

Telephone (860) 286-2929

Facsimile (860) 286-0115

Customer No. 23413

July 23, 2004